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OPLAN SOLAR: SUSTAINABLE OPTIMIZATION OF LOCAL AGRICULTURAL RESOURCES THROUGH A SOLAR-POWERED RAIN HARVESTER IN SAN PASCUAL SENIOR HIGH SCHOOL 1 (SPSHS 1)

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ABSTRACT

This action research titled Oplan SOLAR: Sustainable Optimization of Local Agricultural Resources through a Solar-Powered Rain Harvester in San Pascual Senior High School 1 (SPSHS 1) aimed to evaluate the effectiveness of the existing watering system in the Gulayan sa Paaralan program and to design a sustainable solar-powered rain harvester and water system. The study utilized a mixed-method design integrating quantitative and qualitative approaches. Ninety-eight participants, composed of six teachers and ninety-two learners from the YES-O and STEM Clubs, were selected using the Raosoft sample size calculator. Data were gathered through survey questionnaires and interviews, and analyzed using weighted mean and thematic analysis. Findings revealed that the current watering system was moderately effective (composite mean = 3.04) but faced challenges such as inconsistent water supply, high labor demands, and maintenance costs. Thematic analysis identified five key challenges: irregular water availability, high labor requirements, uneven water distribution, maintenance constraints, and the need for innovation. The proposed solar-powered rain harvester design integrates rainwater collection, solar energy pumping, and drip irrigation to ensure eco-efficiency and sustainability. The study concludes that the project provides a cost-effective and environmentally responsible solution that enhances the school's gardening productivity while promoting renewable energy awareness and environmental stewardship among learners.

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